TOOL DIE MACHINE
PROGRESS
THE NATIONAL TOOL AND DIE JOURNAL

TOOLS, DIES, JIGS, FIXTURES, MOULDS, GAGES, MACHINES
Design and Engineering
PRECISION SPECIALTIES
STAMPING and PARTS PRODUCTION
Official Publication
Special Tool, Die & Machine Shop Industry

EPTEMBER,
1937

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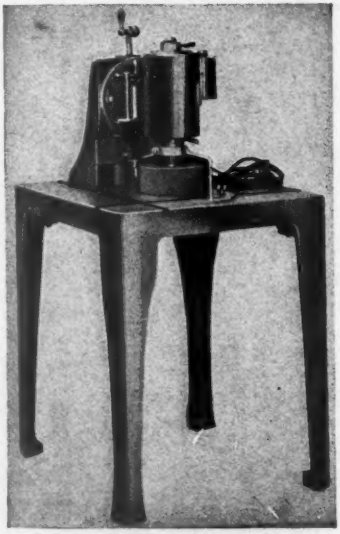

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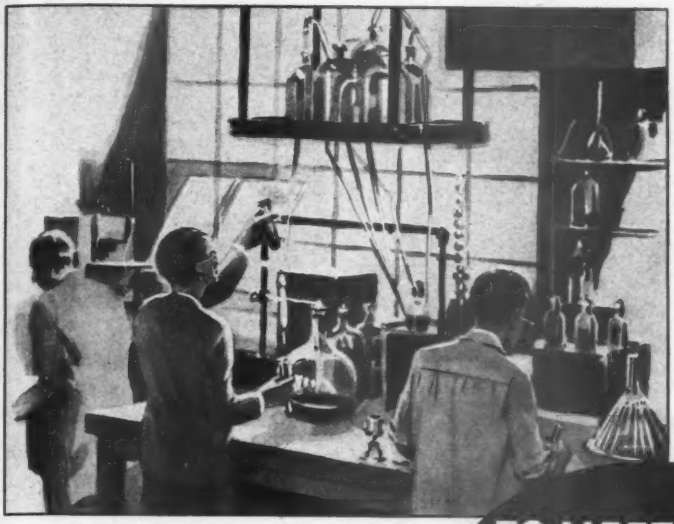

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TOOL DIE MACHINE
PROGRESS
THE NATIONAL TOOL AND DIE JOURNAL

Published in the interest of Manufacturers and Users of
CUSTOM-BUILT TOOLS, DIES, MACHINES AND ACCESSORIES

GEORGE J. HUEBNER . . . *Publisher and Editor*
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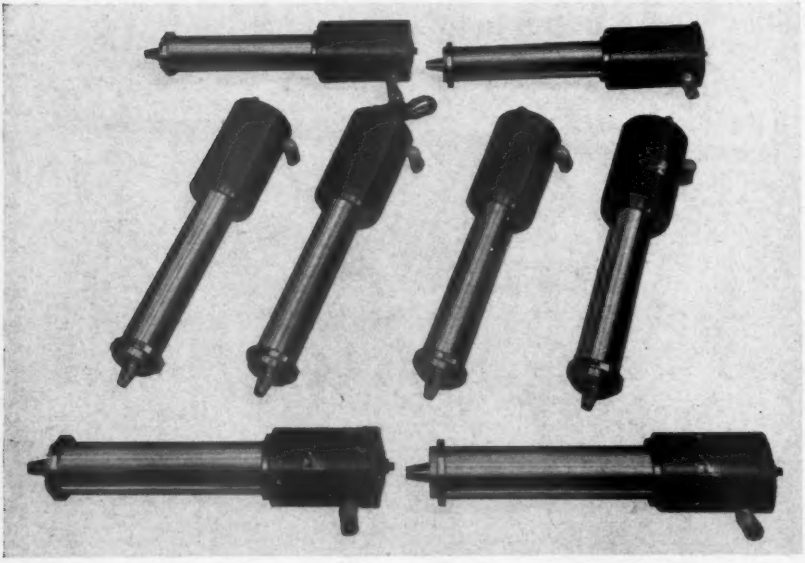

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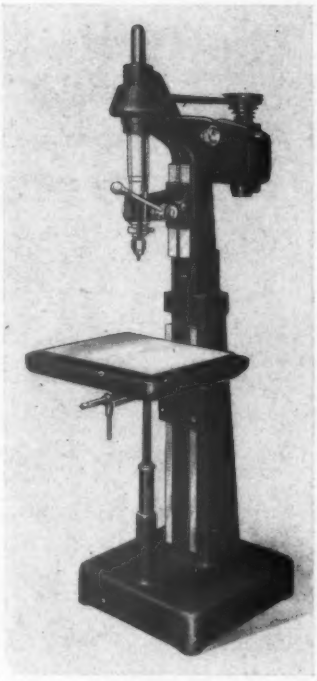

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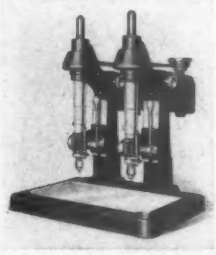

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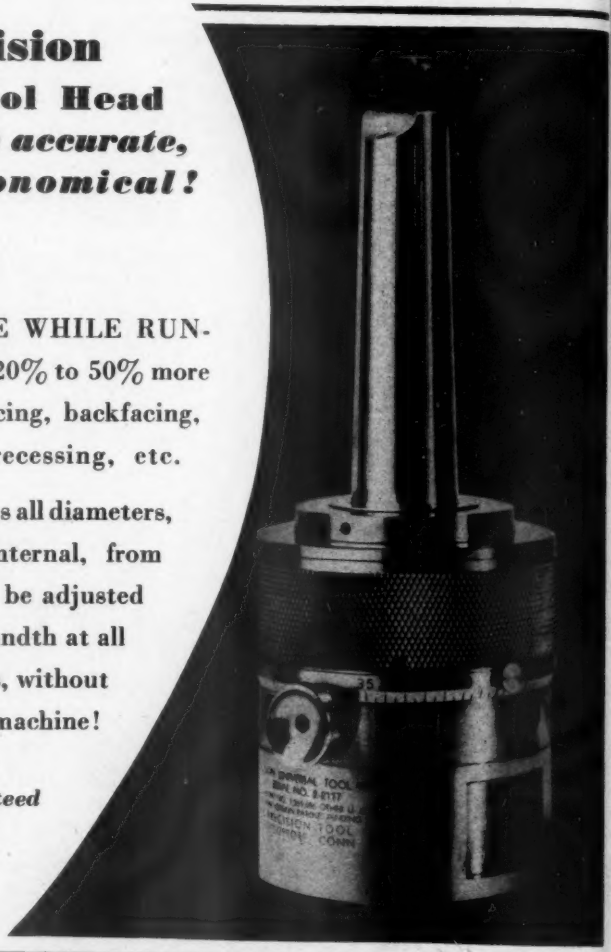

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Tool • Die • Machine **PROGRESS**

The National Tool and Die Journal

September, 1937 **Vol. 3, No. 6**

"The Tool Is Almost a Living Thing, Inviting, Inspiring . . ."

An Editorial

THE writer never passes up an opportunity to express his keen appreciation of the fine products which are designed and built by TDM Industry members and his admiration for the consummate skill which enters into them.

Some executives, accustomed to turning these fine tools out of their shops every day just as a matter of routine, have doubtless smiled inwardly—and sometimes outwardly—at the writer's enthusiasm for the Industry whose accomplishments, he believes, are not always appreciated as they should be. But now, as though in full vindication, comes a nationally known figure expressing similar thoughts in unmistakably sincere language.

Not long ago W. J. Cameron, whom almost everyone will immediately recognize as radio commentator on the Ford Sunday Evening Hour said:

"Man has been described as a tool-using animal, but that is a partial description. Bigger than that is the fact that man has a tool-creating mind. You can read the history of our progress in the story of industrial tools. No one has yet done justice to the fact that not only has production been made possible and quantity has been increased and improvement developed by the machine tools which constantly broadened the market by making things easier to buy—but the skill of the worker himself has been immeasurably developed by the use of the machine tool. That part has been entirely passed by—worse than that, it has been outrageously misrepresented.

We are told that the machine has all but destroyed individual skill and initiative. That false story is preached in forums and in universities. Let me tell you that the unskilled hand of the worker has been educated immeasurably beyond the point that handcraftsmanship could ever have educated it, by the use of the machine tool. The modern tool is the vehicle by which is immediately transferred generations of skill to the modern worker's hands. The stored-up centuries of genius in the tool is somehow conveyed to him who uses it.

The tool is almost a living thing, inviting, inspiring, a present summation of the long years of engineering devotion that created it. No one has yet delved into that phase of the matter.

We have thought of machines as heavy, crude and noisy things, until one day in a new light we saw how much more beautiful the machine becomes the more perfectly it serves its purpose. And why should not those things be beautiful which have had so great a share in the refinement and humanizing of our common life?"

To the practical man these words may seem poetic—to think of tool steel, cast iron, tools, dies and machines in terms of beauty may seem a bit far fetched, but as the keenest appreciation for fine music is frequently found among those who cannot play a note, and the rarest beauty of the painter's brush is often most appreciated by men who cannot paint a stroke, so the ability of craftsmen who design and build such fine tools can well be appreciated by one who may not himself be able to duplicate their skill.

Present day Designers and Builders of Tools·Die·Machines comprise an industry which has contributed greatly to the advancement of manufacturing methods and processes and will continue to do so—probably in greater measure than ever before.

GEORGE J. HUEBNER

Development of the Automobile All-Steel Body Is a History of the Die Industry

THE development of the use of sheet metal dies in automobile body building is inextricably involved with the progress and success of the automobile industry itself. Prior to the early horseless carriage days, die work, as it is known today, was almost non-existent. Carriage bodies were built of wood solely by hand, and although they served their purpose it was evident, soon after the introduction of the automobile, that this type of body construction was neither enduring in the service nor safe for the speeds which were expected of it.

In the first automobiles the body consisted in bulk of almost 90% of the car itself, because those early efforts merely adapted the carriage body, by means of gears and a small motor, to its proposed use. Since that time, from the standpoint of mechanical development, the automobile has become such an exceedingly complex machine that the paths of the body engineer and the chassis engineer have separated, and the development of these two units, while closely related, has proceeded more or less independently.

The uses to which the automobile was soon to be put required the development of a type of body structure hitherto absolutely unknown, one in which there had to be not only the appeal of beauty and the assurance of comfort, but also one in which safety was a prime consideration. With this in view, the immediate trend was the introduction of metal to fit the body to these requirements.

The early pioneers took comparatively small sheets of steel, stretched and nailed them on wood forms and thus produced the first body panels. To assure beauty of finish the metal panels were slightly "bulged" by wood strainers. These were intended to remove highlights. At the same time continuous cowl panels, that portion of the body which extends over the legs of the front seat passengers and terminates in the dash, were made by "pulling" sheet metal around a heavy wood frame, a hand hammer being used to flange it to the body frame. This method was satisfactory at the time, since over 85% of the automobiles built were open cars and production was limited to comparatively small numbers.

With increasing demands for automobiles, the difficulty of hand-forming sheet steel of that day, to conform it to the many body shapes which could be made of wood, led to the use of softer metals, such as aluminum and brass. This method, however, was short-lived because again the undesirable highlights could not be completely removed from the body panels, and also if by chance the panels were "dinged" or creased in manufacture it was necessary to remove the damaged panel and shrink the metal around the flaw. These "dings" or creases could not be filled with solder because solder of that day would not adhere to aluminum nor could aluminum itself be welded. Likewise, paint could not be depended upon to adhere to the aluminum surface. Special primers and finishers were being developed but the results were not completely successful.

The natural result was a swing-back to steel. It is interesting to note, however, before we leave the subject of aluminum that in 1913 one of the largest body companies was building an automobile body with an all-aluminum top. This design was later discarded because of the difficulty of reproducing it in steel.

The re-introduction of steel was made easier by the development of oxy-acetylene torch welding, and the use of the clincher seam—two pieces of sheet metal laid edge over edge and securely folded—a form of construction with which we are now all so familiar. The original difficulties of making metal conform exactly to the desired shapes were still present but instead of forming the sheets to the body frame itself, it became the practice to build a wood form, which was used time and time again, merely for shaping the body panels. No attempt was made at this early stage to make the

Plymouth's Streamlined Beauty and Rugged Construction Both Depend Upon Modern Sheet Metal Die.

By C. O. McBRIDE
and GEORGE J. HUEBNER, Jr.
Engineers

Plymouth Division
CHRYSLER CORPORATION

panels identical, because, after the crude results from this primitive die, the metal had to be hammered and finished until it had its own individual shape.

The automobile body builder, convinced that a flat sheet of metal could not be finished without highlights, then sought other methods for imparting shape to the panels. Small forming rolls, or French rolls as they were called, which were used to produce curved sections in narrow sheets, had been introduced but they were merely the extension of the metal worker's hammer and the rolls themselves could hardly be considered as dies. They did make possible, nevertheless, the forming of beads and the turning of flanges on the edges of the sheets, which eliminated the necessity of flanging the panels directly against the wood body frame. Another much-used tool was the toggle which stretched the metal tightly over the frame after the initial fastening had been made.

Almost before manufacturers realized it, however, the public demand for automobiles became so great that the primitive methods used in body construction became a serious impediment to further progress, and the automobile manufacturer found himself in a position where body making methods were adding disproportionately to his costs. The introduction of small power presses became a life saver. The first crude dies for forming body parts became available. The body design itself was changed to allow the use of this new tool, and because presses could not handle a sheet larger than approximately 36" x 36," the design of the body was cut up to use these small panels. Numerous small dies were made from rough gray iron castings, no finish on the formed sheets from the die being obtained nor expected. This method was infinitely faster than the old method, and the resultant shapes were a slight improvement over the panels hammered out on wooden bucks, but it was still necessary to take the sheet from the press room to the power hammering room and smooth out the panels so that they could be filled and emeried to the desired finish. The die at this time did not bead or flange the metal, this being done after finishing in the French rolls or even by hand.

A further reduction in cost was now obtained by smoothing the die surface and by using drawing compounds made of oil, which prevented tearing the metal in the dies. From there the natural step was a simple holding ring in the die, which locked the sheet and allowed the necessary shape to always lie in direct relationship with the edges of the steel. These holding rings were simple beads and grooves which gripped the raw sheet tightly all around its edges. This had its disadvantages because it was necessary, after the metal had been formed, to remove the groove formed by the holding bead in the die by hand. Evolution followed its natural course and the holding ring became a separate piece of the die, operating on the sheet through compression springs. This holding pad, of course, contacted the metal before the forming die, and opened up the way for the deep drawing die which was already being demanded by designers and engineers.

Unfortunately this new holding ring was effective only in helping to produce the type of body panels which had been exclusively used up to this time. No intricate shapes or deep draws were possible since the metal tore easily under the pressure of this new machine. The

steel manufacturer disclaimed any responsibility for the tearing of the sheets in the dies, his responsibility ending when the steel was delivered and accepted for thickness and analysis. Moreover, to his way of thinking, automobile manufacturers were attempting the impossible.

Die makers then discovered that, by grinding off the holding pads directly beyond where the metal tore, the sheet could slip slightly, and by allowing a surplus of stock at this point the draw was obtained as it had been desired. True, at the edges of this draw there were wrinkles and seams, but the power hammers took these out and this new method was so much faster and so much more exact that it readily obtained wide acceptance.

The progress of sheet metal dies after the introduction of each new model during this period became a process of trial and error. When the designers developed a new shape and a new body section, eighth-size dies were made and worked and reworked until the desired shape was obtained with the minimum of wrinkles and seams. When the eighth-size die had been perfected, it was copied into a quarter size die and the process of cut and try continued until the die makers were satisfied, and they had developed their full-size set. Now the steel maker began to lend his advice and soon the development of new steels for this new industry was under way.

Looking about in the automobile industry at that time you would have found that the die maker had made startling progress but notwithstanding that, the press room was still the smallest part of the body plant. No one seemed to think that there would ever be obtained from a die a formed sheet whose surface could be finished directly without the necessity of hammering or grinding. The hammer room was still a large part of the metal working department of the plant, and rotary sheers for trimming off the edges of the completed sheet, and rolls for beads and flanges were still used almost exclusively for these operations. On the assembly line the formed shapes were nailed to wood frames, even the nail holes being punched in the flange by hand, and it was necessary to add aluminum mouldings to cover the nail heads. When the body was completed and still in the white, that is without paint, an expert torch solderer added 100 to 150 pounds of

The streamlined beauty of this Plymouth may have been conceived by designers and stylists but a sheet metal die formed every graceful, flowing line and curve in metal and thus made possible the sturdiness and safety of this modern motor car.

weight to the body by filling up the seams, creases and dings with soft solder applied with torch and a wooden paddle. Door panels were being made in one piece up to the belt or window line but it was necessary to flange in the upper portion of the door, and provide a moulding to eliminate the seam. Cowl panels were made in 3 pieces and tacked with an oxy-acetylene torch and again a moulding was added to cover the seams. Back panels were made in 2 pieces and in between the two rear quarters of the body an almost flat sheet was placed since this section was much too large to be die-worked.

Again mounting costs made a change necessary. Die makers had to provide a method to produce reverse shapes in the metal, and this was finally accomplished by striking the same piece twice in two different dies—the shape in two dimensions being imparted in the first die and the third dimensional shape or the folding operation being accomplished in the second. The rotary shears were eliminated by making trimming dies, and the beading rolls disappeared with the addition of forming beads in the panel die itself. Some daring pioneers even attached piercing dies which punched the nail holes into the flange of the panel, eliminating this costly hand operation. This was a tremendous step forward. The elimination of the necessary overhead of the shears and beading machines reduced still further the cost of making the body and the addition of piercing dies eliminated a tremendous amount of metal finishing, since the hand punching of the nail holes had been responsible for many dents in the panel itself. Still, the power hammer work and hand finishing in the metal room added six to eight dollars to the cost of the body, and the torch soldering and the addition of mouldings to the edges of the panels added twelve to fourteen dollars.

The continued development of design, however, was rapidly leading to the type of automobile body which, with its innumerable small panels necessitated by lack of press capacity, was becoming too heavy, when built properly, for anything but the expensive car. Some faster method of obtaining a seam was also necessary, and it was found in the electric spot welder which lapped the separate panels and joined them together by means of a small integral weld. This still required the use of the ever-present

(Continued on page 30)

Over 400 steel parts, every one made by a die, are assembled into this safety steel body. Only correctly designed steel stampings can provide the strength and safety which modern traffic conditions demand. Stamped steel panels are scientifically braced by rigid stamped steel supports.

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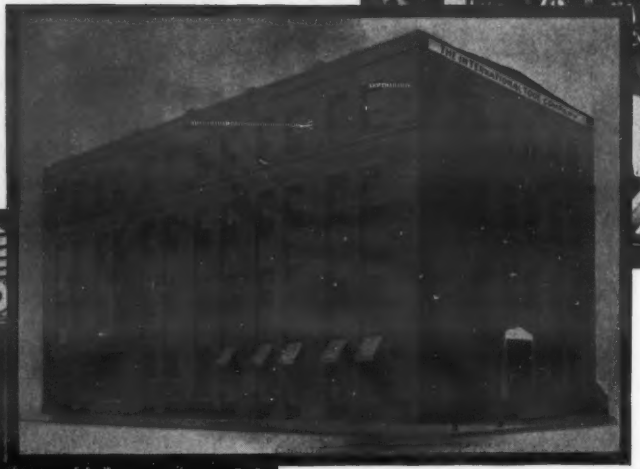

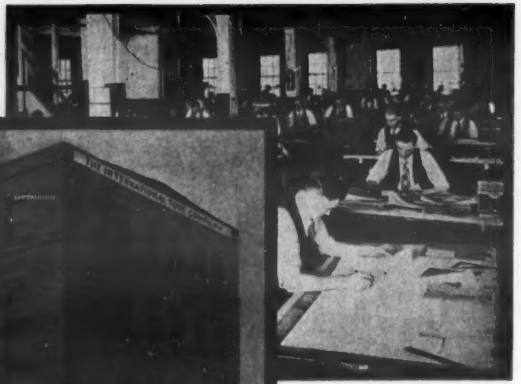

THE

INTERNATIONAL

TOOL COMPANY

J. J. KOHL
Pres.

DAYTON, OHIO

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A THOUGHT

Not long ago a tool supervisor for whom a $15,000 set of dies had been built by "INTERNATIONAL" about TWO YEARS AGO expressed himself to this effect:—

WE PAID YOU, WHAT SEEMED TO US AT THE TIME, A CONSIDERABLE PREMIUM FOR THOSE DIES—BUT—TODAY WE CONSIDER THE PRICE PAID—CHEAP BY COMPARISON. IN FACT—THESE DIES HAVE SET, WHAT WE BELIEVE IS, A RECORD FOR TROUBLE-FREE PRODUCTION DURING THESE TWO YEARS. OUR TOTAL MAINTENANCE EXPENSE HAS BEEN ABOUT TWELVE DOLLARS. WE BELIEVE THE EXTRA COST FOR BETTER DIES IS MONEY WELL SPENT.—

Perhaps it may seem like bragging to infer that "INTERNATIONAL" makes tools and dies good enough to merit such a statement.—Be that as it may—and we readily admit that we do a poor job that slips by once in a while—the fact remains that———

—the fundamental principle of FIRST COSTS vs. ULTIMATE COSTS is very generally being overlooked.

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What American Standards and the ASA Mean to TDM Members

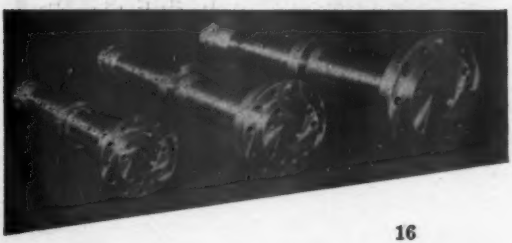
STANDARDS form the common basis for effective cooperation between skilled craftsmen. This is true particularly for standards set up by industry itself and generally adopted by those manufacturing a product as well as by those using it. American Standards, that is, standards approved by the American Standards Association (ASA) are in this class. Many of them benefit the work of TDM members. For example, as users of tools and equipment, these members have a direct interest in the American Standards developed by the ASA committee on Small Tools and Machine Tool Elements: T-Slots, Their Bolts, Nuts, Tongues and Cutters (B5a-1927); Tool Holder Shanks and Tool Post Openings (B5b-1929); Milling Cutters (B5c-1930); Taps—Cut and Ground Threads (B5e-1930); Rotating Air Cylinders and Adapters (B5.5-1932); Jig Bushings (B5.6-1935); Circular and Dovetail Forming Tool Blanks (B5.7-1936); Chucks and Chuck Jaws (B5.8-1936); Lathe Spindle Noses (B5.9-1936); and Machine Tapers (B5.10-1937).

Further subjects under consideration by the ASA committee on Small Tools and Machine Tool Elements are: Steep Machine Tapers; Collets; Punch Press Tools; Splines and Splined Shafts; Electric Welding Dies and Electrode Holders; Rotating Tool Shanks; Multiple Spindle Drilling Heads; and Twist Drills. A proposed standard series of Twist Drills up to ½ inch diameter is expected to be submitted shortly for final approval by the ASA.

Standards in this field interest the TDM group also because machines built by its members often are designed to use standard tools in their operations.

Interchangeability. The primary benefit derived from these American Standards by TDM members is *interchangeability.* For example, when several years ago, the ASA committee on Machine Tapers started its work, a survey showed that close to two hundred different tapers were being used in practice. There was no question of general interchangeability, under these conditions. Now, the American Standard covers the requirements with only 19 tapers whose interchangeability is guaranteed by definite specifications for plug and ring gages to check the tapers.

Interchangeability is important also in regard to component parts used by TDM members in the manufacture of their products. Thus, the American Standard for Screw Threads (Coarse and Fine) has brought about national uniformity of threaded parts, such as machine screws, cap screws, set screws, and the nuts or the tapped holes matching them. This is a development of the last twenty years. In 1904, one of the largest American manufacturers of bolts and nuts made *3 million bolts and as many nuts each week.* "Five departmental tool rooms had grown up in the plant, starting with one man and increasing to five or ten. Various classes of dies and tools were made in each of the tool rooms with no general standard. Duplication was possible, and when it did happen, important discrepancies occurred. In some cases, about the only standard was in the eye of the toolmaker." In 1929, the same company made *10 million threaded parts per day.* And while made in five plants scattered all over the country, they will interchange perfectly. More than that: a ¼ inch, class 2, machine screw made by one company



Lathe spindles with American Standard spindle noses. The entire American Standard series of sizes is designed for use on engine or turret lathes ranging from the smallest to the largest now being made.

By JOHN GAILLARD
Mechanical Engineer

AMERICAN STANDARDS ASSOCIATION

will give a correct fit with a ¼ inch, class 2, nut made by any other company, if both companies work to the American Standard.

A Selection of American Standards. Three hundred seventy-nine American Standards have been approved so far. Among those of special interest to TDM members we list here, in addition to those for small Tools and Machine Tool Elements already mentioned:

In the mechanical field:

Screw Threads (B1.1-1935)
Woodruff Keys, Keyslots and Cutters (B17f-1930)
Shafting and Stock Keys (B17.1-1934)
Small Rivets (B18a-1927)
Slotted Head Proportions, Machine Screws, Cap Screws and Wood Screws (B18c-1930)
Wrench-Head Bolts and Nuts and Wrench Openings (B18.2-1933)
Socket Set Screw and Socket Head Cap Screws (B18.3-1936)
Inch-Millimeter Conversion for Industrial Use (B48.1-1933)

and in the electrical field:

Industrial Control Apparatus (C19-1928)
Rotating Electrical Machinery (C50-1936)
Electric Arc Welding Apparatus (C52.1-1933)
Resistance Welding Apparatus (C52.2-1933)

For example, the standard for Rotating Electrical Machinery gives rules for the rating and acceptance test conditions of fractional horsepower motors. This affects directly the many small motors used in the shop as well Brushes, Carbon, Graphite and Metal-Graphite (C64-1935) as those built into equipment manufactured by TDM members.

Standards like those for Drawings and Drafting Room Practice, and for Preferred Numbers which have a wider scope than the mechanical field, also benefit the work of the TDM group in regard to problems of design and production.

Safety Codes. American Standard safety codes are widely used to maintain safe and healthful conditions in manufacturing plants. A few of these codes, selected here by way of examples, concern the following subjects:

Use, Care and Protection of Abrasive Wheels (B7-1935)
Power Presses and Foot and Hand Presses (B11-1936)
Mechanical Power Transmission (B15-1927)
Forging and Hot Metal Stamping (B24-1927)
National Electrical Safety Code (C2-1927, especially Handbook 7, Installation and Maintenance of Electric Utilization Equipment)
Protection of the Heads and Eyes of Industrial Workers (X2-1922)
Industrial Sanitation in Manufacturing Establishments (Z4.1-1935)

American Standards are available in pamphlet form at a nominal price. A complete list may be obtained upon request, from the American Standards Association, 29 West 39th Street, New York, N. Y.

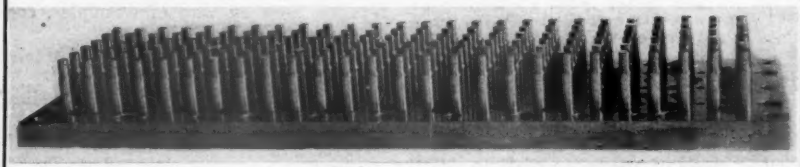
Industry Gives American Standards Prestige. The strength of American Standards lies in three facts. First, they are developed by industry itself, through voluntary cooperation. Second, they get their final approval from the American Standards Association (A.S.A.) *only* if the consensus of all interested groups is in favor of such approval. Third, the ASA promotes the establish-

(Continued on page 42)

American Standard chucks in 6-inch, 8-inch, 10-inch, 12-inch & 15-inch sizes.

HOVIS SCREWLOCK RETAINERS

for punches and dies prove their remarkable superiority when used in such multiple punch assemblies as this automobile radiator core tank piercing die.



156 punches—body diameter .500″, piercing diameter .400″, spaced equally 1″ each way.

Easy removal of one or more rows quickly adapts the die for different radiator designs and sizes.

The Screwlock principle assures:

- POSITIVE LOCK
- ABSOLUTE ACCURACY
- EASY REMOVAL
- QUICK CHANGE

Hovis multiple plates are being successfully used for piercing ⅜″ steel.

SEND FOR DESCRIPTIVE CATALOGUE AND PRICE LIST

We make all kinds of Punches to suit your requirements.

HOVIS SCREWLOCK COMPANY

3129 Larned St., East **Detroit, Michigan**

When you order or write about products described in TDM PROGRESS please mention the publication.

May We Estimate Your Work?

We are Designers and Builders of

TOOLS · DIES SPECIAL MACHINERY

Our Facilities For Large Work Include

- 3 Lucas Precision Horizontal Boring Mills
- No. 6 Swiss Drill Jig Borer
- Gray Maxi-Service Open-Side Planer

•

Our experience is your assurance of accurate, dependable workmanship.

Your Discarded Dies and Tools Can Go Back to Work.

We have developed a method for repairing and reclaiming the worn edges of dies, punches and tools without annealing. No drawing of temper—No rehardening. New edges compare favorably with high speed steel. The cost is small—savings have been as high as 90% of original cost.

Investigate!
Let us show you!

The Bunell Machine & Tool Co.

1600 East 24th St. CLEVELAND, OHIO

PRospect 2681

When you order or write about products described in TDM PROGRESS please mention the publication.

William M. Phares Appointed Chicago Representative of Tool-Die-Machine Progress

WITH the formal approval and endorsement of the Board of Directors of the Chicago Division of the Special Tool·Die·Machine Shop Institute, William M. Phares, Division Secretary, becomes advertising representative of Tool·Die·Machine PROGRESS in the Chicago industrial area.

Bill Phares, as he is known to most of the Industry, is an "old-timer" in its activities, both nationally and in Chicago. Appointed in 1931 to the secretaryship of the original National Die and Special Tool Builders Association of Chicago, he has enjoyed the confidence of Industry members to the point where he has been re-elected each year since.

Coincident with NIRA legislation, Mr. Phares, realizing the desirability of a National Trade Association, took steps to arouse the interest of Industry groups in other districts. Called to Washington to participate in the formation of the Industry Code, he met with delegates and committees from other Industry divisions, among whom were J. J. Kohl, representing the Tool Manufacturers Association of Dayton, Ohio, and C. C. Richard of the Automotive Tool and Die Manufacturers Association of Detroit, Michigan. They were successful in convincing government officials of the necessity for an individual code which, in the final analysis, was reasonably favorable to the working conditions which are necessary in the TDM Industry.

At the convention held in Cleveland in 1933 when the Special Tool, Die and Machine Shop Institute, the National Trade Association of the Industry, was formed, William Phares was elected secretary. The National Institute's office was first established in Chicago but later it seemed desirable to locate it more centrally and, with its removal to Cleveland, Mr. Phares resigned as National Secretary to devote all of his time to the development of the Chicago Division.

Under his administration the Chicago Division membership numbers approximately 100 active members and a like number of associates. Numerous services of great value to the membership have been developed among which are:

1. An Employment Bureau which registers shop workers and their qualifications and refers them directly to shops where jobs are open.

2. Wage Surveys which enable Industry members to maintain proper schedules of wages.

3. Tax Surveys which supply members with information on local and national taxes.

4. Regular courses in tool and die designing and estimating which are approved and accredited by the Chicago Board of Education.

5. An Employees Relations Committee which has been remarkably successful in adjusting matters of vital interest to both employer and employee and thus has prevented serious labor disturbances in the Chicago area.

The Chicago Division, through a committee consisting of Mr. Phares and individual members, succeeded in obtaining exemption from the State-wide Retailers Occupation Tax (Sales Tax), for the products of Illinois TDM Industry Shops.

William Phares' experience qualifies him well to represent Tool·Die·Machine PROGRESS but even more he now is in a position to substantially augment his already valuable service to the Industry and its members.

Saves Hours of Set-up Time
•
Accurate to Precision Limits

The MAGNA-SINE
A Magnetic Sine Table Adjustable to ANY DESIRED GRINDING POSITION
ROBBINS ENGINEERING CO.
637 Mt. Elliott Ave. Detroit, Mich.

When you order or write about products described in TDM PROGRESS please mention the publication.

The Editor Receives a Comment On Lyons Article in August Issue

I WAS very much interested in reading Mr. Joseph H. Lyon's article in your August magazine. It is a very frank article but everything that is in it is the truth. The article should be very helpful, not only to the men who have the responsibility for buying Tools, Dies and Special Machinery, but also to the members of our own Industry who make them.

There are two ways to explain the great variation which sometimes occurs in estimates submitted by different shops. One is that it is quite a trick to take a drawing or a blueprint with only two dimensions, project the third in thought, and therefrom determine the length of time required to perform the operation detailed. It is not as easy as estimating the cost of constructing a building because that can be figured readily if one knows the number of bricks a man will lay in a day. There is no such standard for either the machine or the handwork on a custom-built die, for instance.

The other reason is that the human element enters into tool and die building to a greater extent that it does in almost any other trade. It has been said that tool and die makers are not made, they are born. This may be an exaggerated statement, however, there is no question but that the man who is a "natural" runs rings around the workman whose learning of his trade was difficult and who, regardless of the number of years he works at it, has to painfully make his way through each phase of the work.

Men who operate tool and die shops so frequently lose on jobs for the two reasons set forth. Then the buyer who invariably places his orders with shops who are extraordinarily low has his inning. Mr. Lyons says, "To take advantage of that situation rarely turns out to be satisfactory to the buyer and, of course, it definitely entails a loss for the seller." I presume he means that when it is discovered that an estimate was too low, and that there will be a loss on the job, that shop is very likely to lose interest and complete the tool or die as quickly as possible, sometimes not as carefully as should be, but there are shops who, after they have been unfortunate enough to slip in estimating a cost, do not change their attitude toward that piece of work in the slightest. It is turned out just as perfect even though the builder "loses his shirt," as the expression is. Under those circumstances there are buyers who, just because it is natural for them to play the game, recognize a request to examine into the cost of the work and time and again they have been known to pay an additional sum which at least forestalls actual loss for a tool builder. I believe that aside from the sportsmanship which enters into such a policy, it is rattling good business. When a buyer once gets the name of being a "cheap" buyer, one who seeks every advantage for himself and the "devil take the hindmost," he lays himself open to being charged plenty when shops are filled with work and no one needs more; then he becomes a buyer without friends.

I think your publication should be commended for encouraging the frank discussion of this relationship between the buyer of Tools, Dies and Machines and the contract builder of them. With labor conditions as they are, it is becoming ever more evident to the production manufacturer that his advantage lies in fewer employees and not more. One of the places where the production manufacturer can cut down his force and his payrolls substantially is in the tool room and the die shop. And, that is not all, because he also eliminates a lot of expensive machine tool equipment, most of which he cannot possibly use for twelve months of the year. J. R. H.

MORE WORK - BETTER WORK

Machinists, Tool, Die and Pattern Makers will turn out more work of high quality, and do it more easily when their tools are given systematic care in a GERSTNER Chest. Help them choose from FREE CATALOG.

GERSTNER TOOL CHESTS

56 Columbia St., Dayton, Ohio

When you order or write about products described in TDM PROGRESS please mention the publication.

Tool Die Machine Contract Shops
Cleveland, Ohio

BARTH STAMPING & MACH. WORKS
W. 34 & DENISON SHa. 1857
DIES—TOOLS—JIGS—MOLDS
GLENN A. BARTH THOM. A. BARTH
J. A. BARTH J. J. BARTH

***THE BUNELL MACHINE & TOOL CO.**
1600 East 24th St. PRospect 2681
JIGS—FIXTURES—GAGES—MODELS
Blanking, Forming, Drawing, Piercing
Trimming, Bending and Coining Dies
Special Tools and Machinery

CLEVELAND UNIVERSAL JIG COMPANY
13404 St. Clair Ave. MUlberry 3322
Designers and Builders
Jigs & Fixtures Special Machines
Production Engineering
COMPLETE PLANT ROUTING and TOOLING

THE DENNING MANUFACTURING COMPANY
1775-81 East 87th St. CEdar 0801
Designers and Builders
HIGH GRADE DIES

HAHN MANUFACTURING COMPANY
5332 Hamilton Ave. ENdicott 2205
Modern equipped shop for building of
MEDIUM AND LARGE
DIES, TOOLS, SPECIAL MACHINERY
Equipment includes:
3" and 5" spindle Horizontal Boring Mills
Large planers Vertical Mill

THE INDUSTRIAL MACHINE CO.
1436 East 47th Street Founded in 1903
Builders of Special Machinery
GENERAL MACHINE WORK

***LYONS MACHINE COMPANY**
5681 Tillman Ave. WOodbine 2440-2441
Manufacturers Special Machinery
Tools, Jigs, Fixtures Tungsten Carbide Tools
SWISS JIG BORING

***THE McKINNEY TOOL & MFG. CO.**
1688 Arabella Rd. KEnmore 1681
Roller Die Forming Machines
Automatic Saw and Shear Cut-off Machines
Special Machinery—Dies, Jigs and Fixtures

MODERN TOOL & DIE CO.
P. O. Box 2741
West Park Branch CLearwater 6149
DESIGNERS AND BUILDERS
Tools & Dies *Special Machinery*
STAMPINGS

***OHIO TOOL COMPANY**
3160 West 106th St. CLearwater 3200
Designers and Builders
SHEET METAL DIES, TOOLS, SPECIAL MACHINERY, DIE CASTING DIES, RUBBER MOULDS
•
Modern Facilities
150-Man Shop

THE PARAMOUNT TOOL CO.
1392-98 East 43rd St. ENdicott 2220
JIGS, FIXTURES, DIES
Experimental Work

The PHOENIX ICE MACHINE COMPANY
2711 Church Ave. CHerry 1048
72" Vertical
BORING MILL WORK
Let us figure

A. P. SCHRANER & COMPANY
3338 Payne Ave. HEnderson 8644
EXTERNAL CYLINDRICAL
LAPPING MACHINES
Special Machinery
TOOLS, DIES, JIGS, FIXTURES

***THE SOMMER & ADAMS CO.**
18511 Euclid Ave. KEnmore 0610-0611
DESIGNERS AND BUILDERS
Special Machinery
TOOLS, JIGS and FIXTURES

*See larger display advertisement also.

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Tool Die Machine Contract Shops
Cleveland, Ohio

***STAR MACHINE & TOOL CO.**
Established 1903
9320 Woodland Ave. GArfield 2060
DIES - JIGS - FIXTURES
Special Machines
JIG BORING with
Pratt & Whitney Precision Equipment
NEW OPENSIDE PLANER EQUIPMENT
12 ft. x 48" Capacity

TOOLS & GAGES, Inc.
3106 East 63d St. MIchigan 7230
"Let us be your tool room."
DESIGNERS AND BUILDERS
Tools, Gages, Dies, Jigs, Fixtures
Special Machinery
SWISS JIG BORING
DIE CASTING DIES

***THE J. C. ULMER COMPANY**
1791 East 38th St. HEnderson 4601
Tools, Dies, Jigs, Fixtures
Special Machinery Designing and Building
Experimental, Model, Punch Press and
Screw Machine Work

THE VARIETY MACHINE & STAMPING COMPANY
12695 Elmwood Ave. LAkewood 8433
DESIGNERS AND MANUFACTURERS
DIES
METAL STAMPINGS
We are equipped to make dies and stampings
in production up to 250 tons capacity

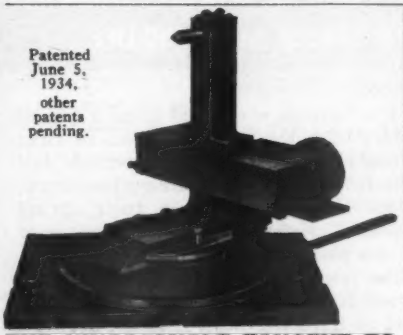
Dayton, Ohio

***THE INTERNATIONAL TOOL CO.**
434-438 East First St.
Manufacturers and Engineers
Dies, Jigs, Fixtures, Gages
Special Machinery, Machine Work, Designing

Hamilton, Ohio

***THE HAMILTON TOOL COMPANY**
220-222 North B Street
Designers and Builders of
Tools, Dies, Jigs, Fixtures, Special Mach'y
The Hamilton Portable Elevating Table

*See larger display advertisement also.



Patented June 5, 1934, other patents pending.

THE VINCO ANGLE TANGENT TO RADIUS DRESSER

For Internal, External and Surface Grinding Machines

The Vinco Angle Tangent to Radius Dresser, with its basic patented feature of dressing angles and radii from the same axis without moving the diamond, has revolutionized the dressing of angles and radii tangent on abrasive wheels. It saves 75% in dressing costs and eliminates all worry and uncertainty. It is precision made and guaranteed to be satisfactory.

Send for Descriptive Circular.

VINCO TOOL COMPANY
7352 Central Ave. Detroit, Michigan

PRECISION PAYS

ESPECIALLY WHEN IT GOES WITH SURE DIE SPRING PERFORMANCE AND LONGER DIE SPRING LIFE

DANLY DIE SETS AND DIE MAKERS' SUPPLIES
Order from
Your Danly Branch

BRANCHES:

LONG ISLAND CITY, N. Y.
36-12 34th STREET

DETROIT, MICHIGAN
1549 TEMPLE AVENUE

CLEVELAND, OHIO
1745 ROCKWELL STREET

DAYTON, OHIO
990 E. MONUMENT AVENUE

PHILADELPHIA, PA.
3913 N. BROAD STREET

ROCHESTER, N. Y.
16 COMMERCIAL STREET

MILWAUKEE, WIS.
513 EAST BUFFALO STREET

● Danly Die Springs are coiled from a special spring wire of a Keystone section so that strength and clearances are uniform inside and out. The result is: first, accurate performance; and secondly, ability to retain their spring under repeated closings of the die. Failure of a spring can easily result in destruction of a die and the tying up of an entire production line. If there is one place in the die where it is important to have the best, it is the springs.

Precision Pays—Insure it by specifying Danly Flat Rounded Springs—and all Die Makers' Supplies.

DANLY MACHINE SPECIALTIES, Inc., 2121 So. 52nd Ave., Chicago, Ill.

DANLY PRECISION DIE SETS

When you order or write about products described in TDM PROGRESS please mention the publication.

PRECISION PAYS

6 WEEKS FROM NOW I COULD TELL YOU WHICH IS WHICH

DANLY DIE SETS AND DIE MAKERS' SUPPLIES
from the
8 Danly Branch Stocks

BRANCHES:

LONG ISLAND CITY, N. Y.
36-12 34th STREET
DETROIT, MICHIGAN
1549 TEMPLE AVENUE
CLEVELAND, OHIO
1745 ROCKWELL STREET
DAYTON, OHIO
990 E. MONUMENT AVENUE
PHILADELPHIA, PA.
3913 N. BROAD STREET
ROCHESTER, N. Y.
16 COMMERCIAL STREET
MILWAUKEE, WIS.
513 EAST BUFFALO STREET

● Die Sets look alike because accuracy to ±1/10,000 of an inch is not visible to the naked eye. But in performance there's a vast difference.

Danly Precision Die Sets have the absolute close tolerance of fit between guide posts and bushings that means freedom from shearing, more accurate and faster production, fewer regrinds and longer life for the die.

Precision Pays—secure it by specifying Danly Precision Die Sets for your dies.

DANLY MACHINE SPECIALTIES, Inc., 2121 So. 52nd Ave., Chicago, Ill.

DANLY DIE MAKERS' SUPPLIES

When you order or write about products described in TDM PROGRESS please mention the publication.

CHICAGOLAND

Devoted to the Affairs of the CHICAGO DIVISION Special Tool, Die and Machine Shop Institute

THE Chicago District of the Special Tool, Die & Machine Shop Institute held its Annual Meeting at the Midwestern Athletic Club on Thursday evening, September 16th. The annual election of officers resulted in the re-election of all incumbents. Karl Harig, President of the Harig Manufacturing Company, was re-elected President; E. W. Fritzell, of the Phoenix Tool & Mfg. Company, Vice President; Carl Danielson, of the Service Tool & Die Manufacturing Company, Treasurer. W. M. Phares was re-elected Secretary.

President Harig's report was one of splendid accomplishment during the year, with the condition of the Association most gratifying to its members. He said:

"A full year has gone by since you entrusted the stewardship of your Association to me. At that time I gave you a report of the condition of the Association and a review of the history of the organization from its birth to the present time. I also made a few promises. Now let us look back and see what kind of a job we have done. First, I want to thank my fellow officers and the members of the Executive Board for the full cooperation given throughout the year. But not alone have the officers and directors done their part; the members as a whole have responded in the same cooperative spirit and I am happy to know that at no time have our members recognized the need of an organization more than they do today. This has been demonstrated, not by a big N R A splash or a lot of noise, but by a real expression of helpfulness to one another and, after all, this represents the real purpose and value of an organization such as ours.

"I wish to mention a few definite results of our labors. First there was the successful settlement of the Sales Tax problem, a job which was started and handled so ably by my predecessor and friend, Rudolph Bernhardt, and his loyal committee. Not only have we secured a ruling excluding special tools and dies from the Retailers' Occupation Tax, but with the cooperation of other interested industries we have been able to cause the defeat of the proposed Producers' Tax, which was designed to replace the Occupation Tax, and we have even gone so far as to secure, through the State Legislature, an appropriation for the purpose of refunding to our members the Occupation Taxes paid before the revision of the ruling regarding the products of our industry.

"We have passed unscathed through the most turbulent national labor unrest in the history of our Country. Our employee relations committee, with its most diplomatic chairman, Miles Irmis, faced a difficult task in following the middle of the road. At times the committee was divided in its opinions, but we were successful in avoiding serious labor trouble without disturbing the policies of the individual members, by being always alert and well informed of the real facts in our shops and by following a fair and progressive policy toward our employees.

"We have gone forward in our educational program, having materially increased the efficiency and loyalty of many of our employees through our evening classes in tool and die designing and estimating. The fall semester has just begun, with the addition of a new class in elementary designing and an additional instructor for this subject in the person of Charles Bohmer of the Brust Tool Mfg. Co. George Dannes will continue as instructor of the advanced classes. This year we have over one hundred students enrolled.

"We have, during the past year, increased our membership by sixty-three per cent. Our treasury is in healthy condition. We have no accounts payable

Reported by

WILLIAM M. PHARES, Secretary

and no delinquent members. I am not foolish enough to tell you that all these good things are entirely due to the efficiency of your officers. Improved business conditions have been largely responsible. I will not attempt to outline any definite policies for the coming year. Unforeseen conditions develop too rapidly to permit that, but I will promise you that with your continued wholehearted cooperation, which I fully expect, we will confidently face any situation that may arise.

"One matter which I will bring to the attention of the Board this year is the need for more concentrated development of apprentices. If we are to continue as an Industry we must give more attention to those young men on whom we must depend to carry on in the future. If these boys are given your sympathetic consideration at this time and are made to understand the true relationship of employee and employer they will, in turn, learn to see your side of the picture. This sort of cooperation is bound to produce more and better mechanics and will eventually eliminate labor troubles. In conclusion, I want to again thank all of you for your fine spirit of helpfulness and your continued confidence. I shall do my best."

W. M. Phares, Secretary of the Chicago District, explained the provisions of the new Illinois Unemployment Compensation Law and informed members that the Institute office was prepared to advise and assist in working out individual problems which may be presented as a result of this law.

It was unanimously decided to have the Annual Fall Dinner Dance in November. Miles Irmis was appointed Chairman of the Entertainment Committee and instructed to select his own assistants.

GOLF TOURNAMENT

THE most successful golf season in years reached its climax and culmination at the famous Glen Oak Country Club on Friday, September 17th. A feature of the tournament was the match between Bill Mell of Federal Tool Corp. and Bert Wallace of Machinery Products Corp. for possession of the Danly Cup, symbolic of the championship of the TDMI golf league. This match was the final of an elimination contest conducted at the monthly tournaments held throughout the summer, beginning in May, and was won by Bert Wallace. All hail the new Champ! The tournament was attended by forty-nine of the Association's ardent golfers. The golf committee, headed by Rudy Bernhardt of the Federal Tool Corporation, had acquired valuable prizes and merchandise certificates which assured every golfer present at least one prize. Elmer Johnson, Conrad Peterson and Herman Gardner of Gear Specialties, Inc. surprised the boys by bringing out a trio of instrumentalists and singers to entertain at the nineteenth hole and during the dinner hour. Al Lindberg of Lindberg Steel Treating Company, popular hero of the golfers, and all around good fellow, as usual led the community singing. Roy Johnson of Imperial Die Casting Company, song bird de luxe and former radio star, also obliged with a few numbers, including "Old Man River" and "Wagon Wheels."

BOWLING LEAGUE

THE TDMI bowling league got away to a flying start at the Cinderella Recreation Alleys, Central Ave. and Madison St., on the evening of September 13th. The league will have twelve five-man teams again this year. Fifty-two bowlers reported on the first night, which is a record turnout for the opener. For the most part, the opening scores were rather mediocre, although Jim Pesek of Midwest Engraving Co.

(Concluded on page 45)

Experience... FOR SALE

Experience can't be taught—it is knowledge derived from one's own effort—it is strictly an individual matter.

Experience enables one to instinctively know the right and the wrong of a design, a method or a process.

Experience is invaluable—not alone to him to whom it belongs, but likewise to all others for whom its application may quickly solve a troublesome problem or provide a better method.

The invaluable experience which every CONTRACT TOOL, DIE AND MACHINE BUILDER has acquired in designing and building tools for the production industries is often the most important element of his expert service.

It is available to every Special Tool · Die · Machine user. Always call in Members of the TDM Industry to help in solving your production problems.

SPECIAL TOOL, DIE & MACHINE SHOP INSTITUTE
A NATIONAL TRADE ASSOCIATION
This advertisement is one of a series intended to describe the TDM Industry.

When you order or write about products described in TDM PROGRESS please mention the publication.

Tool Die Machine Contract Shops
Detroit, Michigan

DAVIS TOOL & ENGINEERING COMPANY
6481 Epworth Blvd. TYler 46070
TOOLS and DIES
Special Machinery
Sheet Metal
Stampings and Assemblies

***ENTERPRISE MACHINE PARTS CORP.**
Jerome Ave. at McNichols Rd. E. LOngfellow 9643-4
Manufacturers of
PRODUCTION MACHINE REPAIR PARTS
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PRECISION GAUGES and TOOLS
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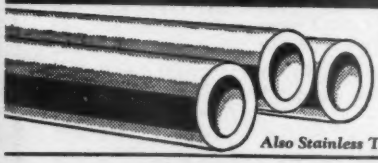
*See larger display advertisement also.

OIL HARDENING TOOL STEEL TUBING



Substantially reduces labor costs by eliminating the expensive procedure of drilling from the solid.
BISCO TOOL STEEL TUBING is a fine grade tool steel in tubular form available in sizes up to 14" diameter and 2" wall thickness; other sizes to your specification.
THE BISSETT STEEL COMPANY
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Automobile All-Steel Body

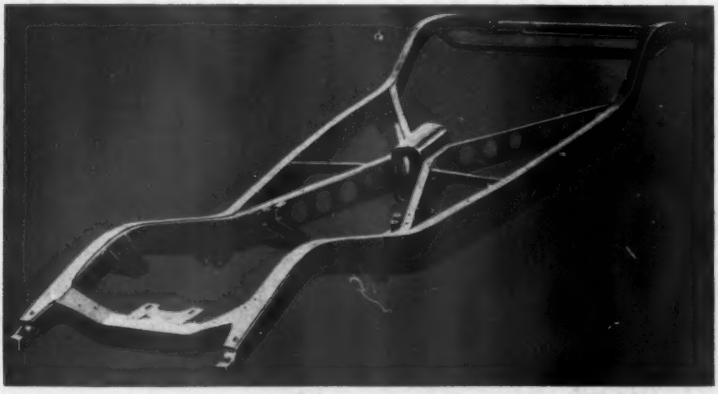
(Continued from page 13)

moulding to cover the welding spots, and although larger and larger presses were being used to form ever larger sheets, the amount of metal added in these mouldings and pieces just to cover up the joints, and the labor to do it, were costly and undesirable items. In addition the body itself, although heavily armored with steel, still was essentially a wood structure, and was limited by all the ills and difficulties which beset wood when it is exposed to the elements and at the same time subjected to violent stresses. The die maker again came to the rescue and by forming deeper sections in lighter gauge metal it was found possible to eliminate wood in innumerable places and replace it with a light steel structure which was infinitely stronger. For the most part these reinforcing members were riveted to the wood body frames or to the outside panels. The electric spot welder was still a slow and difficult piece of equipment and its use often resulted in burning the metal rather than welding it, in some cases requiring extensive and costly repairs to the partly finished body.

About 1928 this trend had become firmly established and the Crysler body engineer chose as his slogan: "Shape instead of weight." This slogan is definitely responsible for the development of the all steel automobile body as we know it today, since without the present-day shaping of the structural members of the body it would be too heavy to use if made entirely of steel.

At this same time elimination of hand finishing methods had been almost completed and body panels were being received from the press room with surfaces sufficiently perfect to have paint applied directly after cleaning. The troublesome and costly wrinkles and seams which formerly had to be hammered out had bowed to the progress of the die maker.

The increased speed of the automobile which was developed during this period required greater protection for its occupants. Wood could no longer serve because, although light and admirably adapted to production manufacture, it did not have the strength of a properly made steel structure, and in addition would not withstand the continual pounding at high speeds to which automobiles were being subjected. The development of the safety steel body in which all the structural members themselves were steel was inevitable, and from 1928 until 1934 this type of body came into extensive use, but wood pieces were still in the top, in the doors and between the body sill and the frame of the car. The annoying tendency of the steel body to transmit mechanical vibrations to the passengers had to be overcome in some



Today's automobile frame is a carefully engineered product, every part a die stamping, riveted and welded into a unit of incomparable strength and rigidity.

manner but the demands for increased strength and decreased weight continued and today the Chrysler automobile body, with the exception of the upholstering of course, is composed entirely of steel, no wood being used at any point. Even the fastening of the upholstery is made over a fibre strip or directly into a formed metal channel.

Today the finished body, before the application of paint and upholstery, weighs approximately 500 pounds and costs less than 25 cents per pound. This structure is completely fabricated by dies, and there is less hand finishing on the entire body today than probably would have been applied to one door panel twenty years ago. To reproduce this 500 pound body by the hand methods of 15 to 20 years ago, just to draw a thought-compelling comparison, would raise the cost to utterly impossible heights and, of course, interchangeability would be almost completely lost.

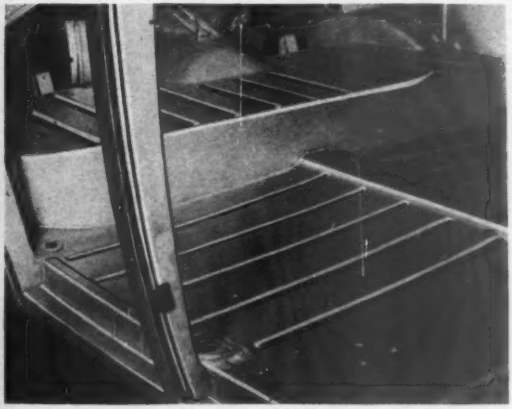
As previously stated the use of the all-steel body necessitated a great deal of development in the elimination of vibration and noise in a car. When the wood sills were removed and the steel body placed directly on the frame channel it was found that the car appeared light or tinny, and passengers felt uncomfortable riding in it. Engineers knew that this was only a psychological impression and that the car itself would be more stable and much safer if it could be done.

Here again the die maker came to the rescue and the present chassis frame, with its remarkable rigidity obtained by integrally welding and riveting deeply formed channel sections, was developed. Today Plymouth bodies are no longer bolted directly to the frame but are attached through rubber insulated metal outriggers which are a product of a die. They eliminate the transmission of engine and road vibrations into the body.

The present day automobile body for each year's new model is designed to meet requirements of the die maker, at least Chrysler does it that way. Drawings of the finished part furnished to the die shop no longer show just the

(Concluded on page 40)

This steel bracket—12 of which support the Plymouth body on a frame—is an interesting stamping. It is made by a progressive type of die with quickly interchangeable punches. One such die built in a TDM shop has to date a record of 12,000,000 bracket stampings.



Among Chrysler engineers the slogan is: "Shape, not weight, for strength." No products of modern manufacture more positively assure this than metal stampings made from dies. Ribs, grooves and rolled edges strengthen tremendously but add no weight.

From the Gay 90's To the Zooming 30's With Die Set Development

AN interesting story of progress in the tool industry is the development of die sets employing posts and bushings, usually referred to as "leader pin" die sets. This is the type generally used in punch press operations today. Back in the days of horse cars and bustles, practically all punch press work was done in open sets. So far as the records show, the first use of the leader pin die sets dates back to 1893. It was in that year that a large manufacturer of telephone equipment standardized on this type of die set and specified its construction. The present basic principle of guide posts, or pins, and bushings, featured this design. The "leader pin" set was used in various places during the intervening years, but its adoption did not become general until after the Great War.

In reviewing the history of this period, the Chief Engineer of one of the largest typewriter companies made the following statement:

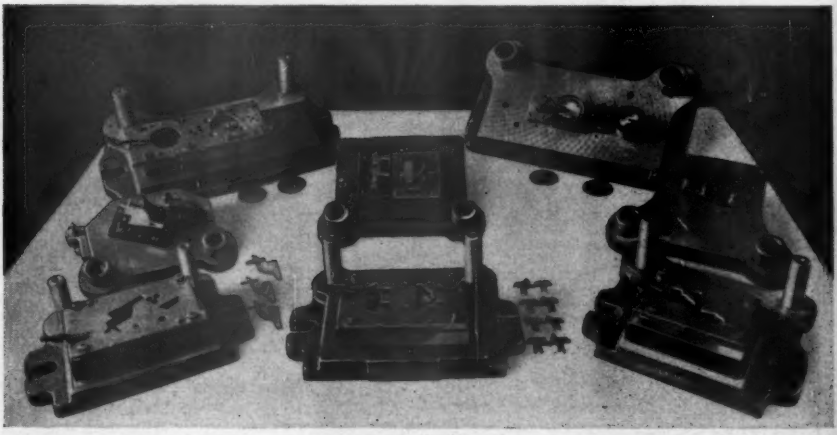
> "Standardized pillar-type punch and die holders, which came to be known as die sets, play a very important part here. Our engineers have long known the advisability of protecting their punches and dies by mounting them in die sets. This company made die sets in large numbers in its own plant before they were available from standardized die set manufacturers."

It was not until 1920 that the die set was brought into general prominence. It came about when an automotive company was establishing a new plant on the eastern seaboard. This company let to a tool shop its contract for dies, submitting a standardized die set design which employed hardened and ground pins and bushings. After completing the contract, the tool shop recognized the practical side of this idea, took out a patent on such a die set, and began making them in a very small way.

Standardized Die Sets at Lower Cost

Prior to 1920, several concerns had made die shoes and punch holder castings, but never before had a completed set been offered commercially.

Finally, in 1922, standardized die sets began to be offered by several manufacturers at a price which meant a lower cost than the user could obtain by making them in his own plant. Naturally, the entry of these manufac-



When you order or write about products described in TDM PROGRESS please mention the publication.

The Age of Mass Production Brings "Leader Pin" Die Set

By P. H. DANLY,
Vice-President and General Manager
Danly Machine Specialties, Inc.

turers into the field brought the patent situation to a head. It was then established that the leader die pin set was known and used as far back as 1893. No patent restriction had existed, and the field, therefore, was open to all manufacturers for free competition on the basis of quality and cost. Practically all of the original standardized die sets offered hardened and ground pins, some with bushings and some with bosses that served as bushings. This latter type quickly disappeared and, today, practically all die sets are considered from the basis of hardened and ground pins and bushings made of various alloys.

There has been considerable progress made in the accuracy and workability of die sets since 1922. One manufacturer developed interchangeable sets which make it possible to change size or punch holders as needed, and to use several punch holders with the same die holder.

The all-steel set was also developed in this period, first by the use of forgings and then, with the advance of acetylene torch cutting, by the torch-cut method. Today, the standardized series offer practically any type desired in either steel or cast iron, and the torch-cut method makes readily available, at a reasonable cost, any type of steel set the engineer could design.

The Value of Accuracy in Die Sets

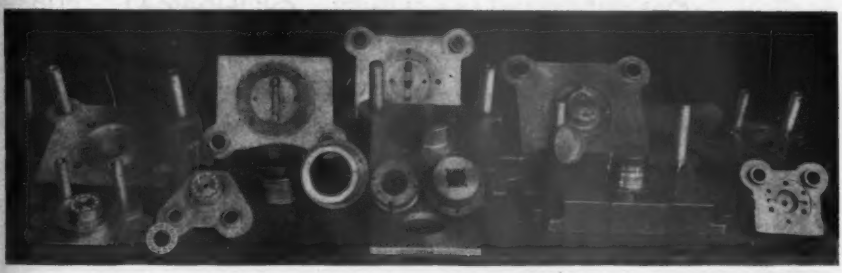
Basically, the advantage of the leader pin die set lies in the greater accuracy with which the pins and bushings guide its action. With the sets available today — with the pins and bushings hardened, ground and lapped to within plus or minus one ten thousandth of an inch — practically any degree of accuracy can be obtained.

The net result in the varied use of die sets can be very easily summed up. Dies properly mounted in die sets are practically free from shearing and have much longer cutting life. Also, the greater accuracy of operation results in more accurate parts, eliminating or saving in the cost of further finishing. More accurate parts and greater ease of assembly make for lower cost and more accurate operation in the finished product.

Together with the industrial developments of the last 20 years has come an increased use of stamping. How the industry has grown is best judged by the fact that practically all of the major developments which we regard as symbolic of the 20th century employed stamping to a very large extent.

Today, these advances include such electrical equipment as telephones, household appliances, electrical appliances and radios of all types. The automotive industry in all its phases uses a great

(Continued on page 40)



National Metal Congress and Metal Show

FIVE outstanding organizations in the Metal Industries join for a 5-day congress in Atlantic City from October 18 to 22.

Sponsored by the American Society for Metals, the cooperating societies consist of the American Society for Metals, American Institute of Mining and Metallurgical Engineers, American Welding Society, American Society of Mechanical Engineers and The Wire Association. Every phase having to do with the handling of metals provides a subject for discussion and included are manufacture, treatment, fabrication, welding, testing and inspection.

Directly under the auspices of the American Society for Metals are two lecture courses by eminent authorities; 1, a five-lecture series on Steel Making by Earnshaw Cook; 2, three lectures on Metallographic Technique by J. R. Vilella.

Mining and metallurgical engineers may look forward to a round table discussion on "Physics of Metals," and the annual "Science Lecture" of the A.I.M.E. on "The Behavior of Gases at Metal Surfaces."

For the Welders there are sessions on both industrial and fundamental research, one of which features the mechanics of welding and the relationship of design to welding which will be presented in a 1-day program jointly with the Mechanical Engineers. The Wire Association program includes a varied group of papers on such subjects as the Fatigue of Springs, Pickling, Cold Heading, Grain Growth, while Copper in Apparatus Manufacture will be discussed by the Non-Ferrous Section.

Every man engaged in any phase of the Metal Industries is invited to be present at this national event, admission being by registration only. Hotel reservations may be made by writing Wm. B. Coleman, Chairman, Committee on Hotels, 16 Central Pier, Atlantic City, N. J.

SAFETY WHEELS FOR PRODUCTION AND GENERAL PURPOSE WORK ON PRECISION MACHINES...CYLINDRICAL...SURFACE . . . FACE AND CENTERLESS GRINDERS

Assist in Lowering Costs by Cutting Freely and Lasting Longer.

DON'T FORGET WE ALSO MAKE SNAGGERS

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Increasing Use of Coiled Stock Brings Demand for Power Driven Straighteners

THE great savings in productive labor, material cost and stock waste made possible through the use of coiled stock have led many metal fabricating concerns to adopt this more modern method of buying material. To take full advantage of all possible economies in this connection, these manufacturers require special equipment to automatically handle the coils of stock. The U. S. Tool Company Inc., of Ampere, East Orange, N. J., manufacture a complete line of automatic press feeding equipment, stock reels, stock straighteners and coil cradles, to handle coiled stock from coil to finished part.

The latest addition to the U. S. Tool line is a power driven straightener for heavy coiled stock. This unit used in conjunction with the U. S. Automatic Coil Cradle and U. S. Slide Feed provides a means of automatically removing stock from heavy coils, straightening it, and feeding accurate lengths to the punch press. Among the exclusive features of the U. S. Power Driven Straighteners are:

1. All rollers equipped with needle bearings.
2. Simple, automatic roll adjustment, rolls always parallel.
3. New coil of stock may be inserted without disturbing setting of straightening rolls.
4. Single movement of operating lever releases feed rolls to start new coil.
5. Can be used in conjunction with U. S. Plain Stock Straighteners for handling thin, springy material.

U. S. Power Driven Straighteners are built in a number of sizes to handle stock up to ¼" thick. Units can be furnished to handle any width stock.

The straighteners are power driven, with variable speed drive. They are mercoid switch controlled and operate intermittently to synchronize with the punch press feeds.

CONTINENTAL MACHINE SPECIALTIES
Incorporated
1301 WASHINGTON AVENUE SOUTH
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We

Invite

You

Dear PROGRESS Reader:

If you will be in Chicago for the Iron and Steel Exposition - September 28th through October 1st, we invite you to visit our traveling display located at 631 Washington Boulevard, Chicago.

We also invite you to visit us at the Power Show - October 4th to 9th, at the International Amphitheatre, Chicago, Booth #442, or at the National Metal Congress at Atlantic City, Booth #B-18.

Nothing takes the place of first-hand examination of accomplished mechanical improvements, and we have endeavored to accurately mirror in our exhibit the place that contour machining on the Doall has taken in the forward march of time and money saving methods.

We hope to see you.

Yours very truly,

CONTINENTAL MACHINE SPECIALTIES, Inc.

By: L. A. Wilkie

L. A. Wilkie, President

When you order or write about products described in TDM PROGRESS please mention the publication.

New Pedestal Adjustable Motor Drive for Lathes

THE South Bend Lathe Works announces a new pedestal adjustable motor drive mechanism which is a separate unit, with the motor and countershaft mounted on a pedestal back of the lathe in a position horizontal with the headstock cone pulley of the lathe. Power is transmitted from the motor to the countershaft by V-belts, and to the lathe spindle by flat leather belt. This provides a smooth, steady pull, free from vibration and chatter. The new drive is available in 5 sizes of back-geared, screw cutting, precision lathes—9", 11", 13", 15" and 16" swing, and in bed lengths from 3' to 12'.

Several new features of the pedestal motor drive include: Motor entirely apart from the lathe, thus eliminating vibration; silent belt drive providing a smooth steady pull; no overhead belts to obstruct vision or to cast shadows on the work; V-belts from motor to pulley enclosed by a guard; screw type belt tension adjustment for any desired pulling power; and release for shifting belt to change spindle speeds.

The new line of South Bend Pedestal Adjustable Motor Driven Precision Lathes have a number of new features and improvements, the most outstanding of which are: Heat-treated headstock spindle with all bearing surfaces hardened and ground, including the taper hole; spindles are special alloy steel, with phosphor bronze bearings, line bored and lapped to a perfect bearing and adjustable for wear; new double wall apron with self-oiling steel gears, and all gear shafts supported on both ends; a multiple disc friction clutch in apron; etc.

South Bend Lathes are noted for the number of practical attachments with which they can be equipped for milling, keyway cutting, grinding, turning tapers, draw-in collet chuck work, gear cutting, etc., in the tool room, manufacturing plant, and general machine shops. Most of these attachments may

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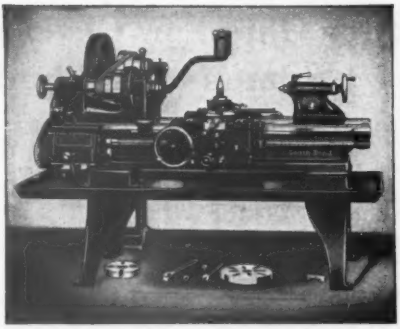
When you order or write about products described in TDM PROGRESS please mention the publication.

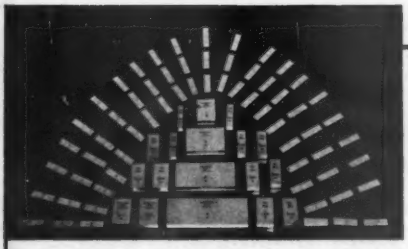
be purchased with the lathe or ordered later as needed.

South Bend Pedestal Adjustable Motor Driven Precision Lathes have the power and rigidity for taking the heaviest of cuts and the precision accuracy for the most exacting tool work. The substantial design assures permanent alignment of the headstock, tailstock, and other major units. Headstock, tailstock, and carriage are hand-scraped to the bed. The lathe bed is heavily constructed and reinforced by box braces its entire length. Has 3 V-ways and one flat way accurately planed and hand-scraped.



South Bend Pedestal Adjustable Lathes are built in both the quick change gear and standard change gear types. Quick Change Gear Lathes are equipped with a quick change mechanism for cutting 48 right and left hand standard screw threads ranging from 2 to 112 per inch, including 11½- pipe thread. Standard change gear lathes are equipped with a set of loose change gears for cutting right and left hand screw threads from 2 to 40 per inch, including 11½ pipe thread. The quick change gear lathe is popular in the manufacturing plant for tool room and production operations requiring frequent changes for threads and feeds. The standard change gear lathe is used in the machine shop, repair shop and manufacturing plant where the quick change feature is not necessary.

The company has issued a new series of bulletins describing each of the five sizes of lathes with accompanying illustrations giving valuable instruction on lathe practice and operation. Any reader interested in securing free copies may write the Technical Service Department, South Bend Lathe Works, South Bend, Indiana, mentioning this publication.



These 81 blocks in Gaging System Set No. 1 are accurate to ±.000008 inch. They make 120,000 different size gages, in steps of .0001 inch, from minimum size of .200 inch to more than 12 inches. Working Set No. 1-B (in case), $295. Prices of individual blocks start at $3.50.

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FORD MOTOR COMPANY, Dearborn, Michigan
Johansson Division, Dept. H

Please send me new Johansson Catalog No. 12 showing all gage blocks and accessories with prices.

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From tin cans to locomotives—today 171 different industries depend on Johansson Gage Blocks for accuracy in manufacturing.

Johansson Gage Blocks and Accessories are manufactured and serviced in the United States by

FORD MOTOR COMPANY
Johansson Division Dearborn, Michigan

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New Ohio Law Governing Working Hours of Women and "Children" Now in Effect

Official Bulletin and Posters for Shop and Office Available

ALL Ohio employers of women and young people under 18 are required by the law effective August 20, 1937, to conform to new and rigid daily and weekly working hours and other conditions.

The law applies equally to one woman, girl or boy, or a hundred in office or in shop. In manufacturing establishments a female "may not be employed more than 45 hours in any one week or more than 8 hours in any one day, or more than 6 days in any period of 7 consecutive days." An exception applies to women "over 21 years of age earning at least $35.00 a week in bona fide executive positions."

Every woman employee must be provided with a suitable seat. Where an establishment has its own lunch rooms, at least 30 minutes must be allowed, otherwise a full hour.

"No employer shall employ a female for a period of more than 5 hours of continuous labor unless such period is broken by a meal period of at least ½ hour, and for the purpose of this section no period of less than 30 minutes shall be deemed to interrupt a continuous period of work."

Females under 21 years of age may not be employed for work which compels them to remain standing constantly, or in oiling or cleaning machinery while in motion.

For every child under 18 years of age, an employer must sign a pledge to employ the child legally and to comply with other conditions required by law. He must keep on file a certificate of age and schooling issued by the superintendent of schools.

High Grade

SHEET METAL DIES • RUBBER MOULDS
TOOLS • SPECIAL MACHINERY

We have had experience in building special dies, moulds, tools and machines for the precision manufacture of many different parts and products. This valuable experience, along with the facilities of a modern, well equipped shop, we offer to all production industries.

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We quote reasonable prices.
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OHIO TOOL COMPANY
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Eliminates costly mishaps and breakage . . . Is a labor saver because it requires only one man to handle . . . Two Sizes: 2,000 pounds and 5,000 pounds.

Write for circular and prices.

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222 North B Street Hamilton, Ohio

In manufacturing establishments, girls 16 to 18 may not work before 6 A.M. nor after 6 P.M. For boys 16 to 18 and girls 18 to 21 the time is extended to 10 P.M.

Penalties of varying amounts and imprisonment for law violations are provided and the burden of proof is distinctly upon the employer. Thus, "The presence of any female employee at the place of employment at any other hours than those stated in the schedule applying to her shall constitute prima facie evidence of violation of this act unless it is proved that her presence there is for some purpose other than employment."

Employers are required to post printed abstracts of the laws conspicuously. These posters, as well as the bulletin, may be had by writing Tool·Die·Machine PROGRESS, 215 Fairmount-Cedar Building, Cleveland, Ohio.

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When you order or write about products described in TDM PROGRESS please mention the publication.

Development of the Automobile All-Steel Body

(Concluded from page 31)

part itself but also a die line to which the die maker builds his die so that individual units manufactured by different sources are made in direct relationship to each other.

To sum up, the body and chassis of the present day automobile would be well-nigh impossible without the progress that the die maker has made, and this has been done without any attempt at compromise. The die maker's part in this march forward has not been finished, however. There are problems of interchangeability, which although showing a great improvement over early days, are still bothersome. Perhaps the solution to this could be accomplished by establishing a reference point on each die, this reference being a point to which the original body design is figured and which would control the individual dimensions to each stamping and each body part. This would eliminate the accumulation of errors which still exist because of the practice of assembling successive pieces which have their individual tolerances, and which added together produce a variation which must be allowed for, and thus continue to provide difficult manufacturing problems.

Die Set Development

(Concluded from page 33)

many of these parts, as do business machines, ball bearings, clocks and other timekeeping and recording devices where extreme accuracy is essential. How great the growth of the stamping industry has been and, consequently, how the importance of die sets has advanced, is shown by the important developments in rolled steel, sheet and strip. One of the major steel companies, specializing in high tonnage production, reports that more than ½ of its annual tonnage is in sheets in all forms, hot and cold rolled, automotive, galvanized tin plates and black enameled. Practically all of this production of the steel companies finds its way into ultimate use by way of the punch press — and in so doing, it is formed in die sets.

We offer production manufacturers

25 Years of Successful Experience

building intricate, special precision Machines, Jigs and Fixtures.

Our plant equipment is perfectly balanced to assure efficient, economical manufacture and we guarantee all of our products to pass your most rigid requirements.

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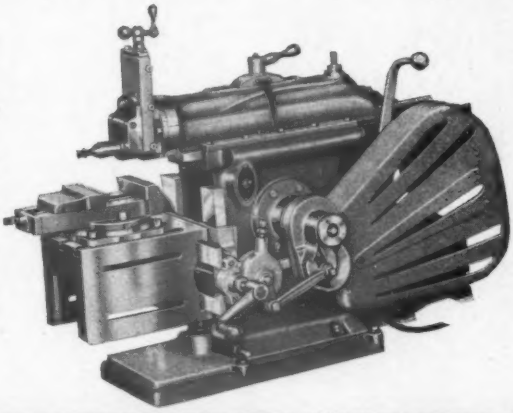
A New 7-Inch Bench Shaper for Tool Room and Production



A small, highly efficient Bench Shaper which incorporates the accepted principles of modern shaper construction is announced by the Atlas Press Company. Indicative of careful design and development, the new shaper shows great efficiency, versatility and economy on small work.

The ram-driving mechanism is bull-gear type; stroke (quick return) is from ½" to 7⅜". Complete V-belt drive from motor to bull-gear spindle provides four speeds between 45 and 200 strokes per minute. Automatic cross speed provides five feeds in either direction between .005 and .025 inch per stroke. It is designed to be operated by a ½ H. P.-1740 R.P.M. motor. A floor stand is available. All bearing surfaces are large and accurately finished, and complete provision is made for adequate lubrication.

The shaper's condensed specifications are: Cutting speeds 3½ feet per minute, table travel, 8½" horizontal, 4½" vertical, maximum distance table to ram 5⅛", minimum distance, table to ram, ⅝". The Atlas shaper is priced at $215.00.

Atlas machine tools now include back-geared lathes, sensitive drill presses, mechanical and hydraulic arbor presses.

For a complete description of the Atlas Shaper, as well as other machine tools, write Atlas Press Company, Dept. 4, Kalamazoo, Michigan.

We used to call 'em safety screws, then hollow safety, then hollow hex — and now hollow set screws. But, through all these years and changes, there's one name that's stuck . . . . . "MAC-ITS."

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American Standards

(Continued from page 17)

ment of national standards in industry in a neutral manner: the technical decisions are left entirely to committees or conferences of experts who freely discuss their problems around the table.

ASA Projects in Course of Development. Work on many additional American Standards is going forward. We shall mention here only one of these projects which is of direct interest to TDM members: that on Classification and Designation of Surface Quality. For years, there has been a need of expressing the relative smoothness (or roughness) and regularity of a machine part's surface in terms of measurement. How does a ground surface with a "mirror finish" produced by one company compare with the "ultra finish" of another company? What is a "commercial" finish? How does a fine diamond-turned surface compare with a ground one? What influence has surface quality on a press fit between two cylindrical parts, or conversely, what finish should the parts have to give a reliable press fit? These problems and many related ones become more important with the increasing trend toward maintenance of close tolerances for the sake of interchangeability. An ASA committee has been studying them for several years and the ASA office keeps in close touch with foreign developments in this field.[2]

Foreign Standards. Some of the TDM members have a decided interest in foreign industrial standards, especially those approved by a foreign national standardizing body in the same way as American Standards are approved in this country by the ASA. Copies of all the foreign standards—some 12,000—are kept on file in the ASA office. At short notice, we can advise an American firm in regard to compliance with foreign national standards. In many cases, we even know in advance, through regular exchange of drafts of standards with foreign bodies, how things will probably be developed abroad. A few years ago the ASA office was able to assist an American company in preparing a telegraphic bid on fixtures to be

[2]A new German book, "Surface Quality in Industry," by G. Schmaltz, was reviewed in the September, 1937, issue of *Industrial Standardization*, monthly magazine of the ASA.

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made for one European country. The specifications for these fixtures were based partly on existing national standards of another Continental country and partly on tentative draft specifications of that country. The data were promptly collected by the ASA staff, a kind of service to American industry which may safely be called unique.

International Uniformity. Industrial standardization cannot stop at home. Inevitably it becomes an international problem. And so, in 1926, the International Standards Association (ISA) was founded—a federation of 18 (now 20) national standardizing bodies, including the ASA. More than forty international technical ISA committees have so far been organized. A unified system of fits between cylindrical parts, developed by one of these committees, had already been adopted in 13 Continental countries. In the United States, the possibilities of its adoption as a national standard (to replace the American Tentative Standard of 1925) are being considered by an ASA committee. The general international adoption of the reference temperature 68 F for gages (adopted in 33 countries) and the inch-millimeter conversion ratio, 25.4, has done away with confusion and consequent loss of time, effort and money in problems involving industrial length measurements and control of quality in production. The most commonly used types of ball bearings are made to the same standards, the world over. A Swedish or French bearing will fit an American car just as well as the original American-made bearing.

What is the ASA? In 1918, when War requirements had clearly shown the urgent need for industrial standards, the ASA was founded by joint action of the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Civil Engineers and the American Society for Testing Materials. Its purpose is to function as a national coordinating body in matters of standardization so that duplication of work and the establishment of conflicting standards by different groups will be prevented. Started as a federation of the five societies named, the ASA now

(Continued on page 46)

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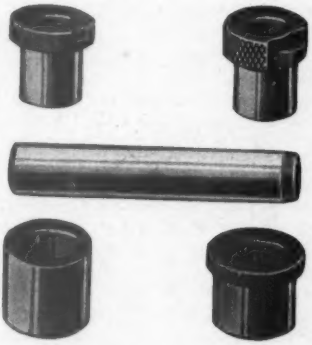

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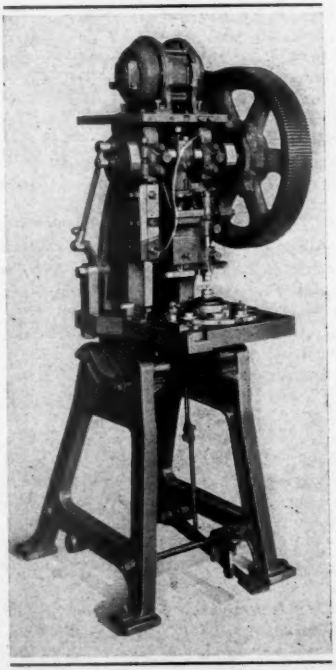
Punch Press Etches Trade Mark On Hardened Steel Parts with Acid

A PUNCH PRESS adapted for etching with acid a trade-mark and number on hardened steel parts has been developed by the Toledo Machine and Tool Company, 1420 Hastings Street, Toledo, Ohio, division of E. W. Bliss Company, and is illustrated herewith. The press has an eight-station dial feed. Attached to the side is a rubber stamp die which is rotated 180° every stroke of the press. The back stamp die comes down touching a pad of acid, then on the next stroke rotates 180° to the front and applies it to the work which has been placed under the die by the dial feed. At the same time that the die with the acid has rotated to the front, the die that was in front rotates 180° to the rear to pick up more acid for the next impression. Thus, a piece is etched for every stroke of the press and, continuing around in the dial, is dropped through a hole in the bolster into a container.

The press, itself, is a "Toledo" No. ¾ open back inclinable, with a 1½" stroke, 6" shut height on the bed and a 1" bolster. A ½ horsepower 900 R.P.M. motor is geared directly to the flywheel supplying the motive power.



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Chicago TDMI Bowling League

(Continued from page 27)

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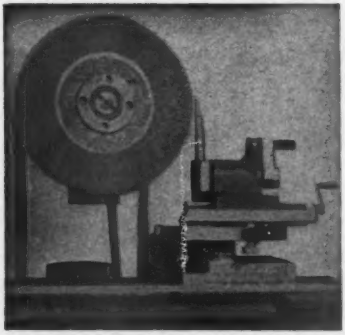

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American Standards

(Concluded from page 43)

has a membership of 44 trade associations, 17 technical societies and 9 departments of the Federal Government, and many company members. Among the ASA member organizations having a large interest in the mechanical field we have the American Society of Mechanical Engineers, Society of Automotive Engineers, National Machine Tool Builders' Association, American Gear Manufacturers' Association, Manufacturers' Standardization Society of the Valve and Fittings Industry, Automobile Manufacturers' Association, Association of American Railroads, Vacuum Cleaner Manufacturers' Association, American Iron and Steel Institute, American Institute of Bolt, Nut and Rivet Manufacturers, National Electrical Manufacturers' Association, the ASA Telephone Group, and the ASA Light and Power Group. The ASA work is financed by membership dues.

All American Standards approved by the ASA are to be considered as recommendations to American industry, to be adopted in a voluntary manner. No pressure is exerted in their development, their approval, or the methods by which their use is promoted.

Any American firm desirous of becoming a company member of the ASA can do so and thus support the national standardization work. Information about membership dues and special services available to members will be gladly sent upon application to ASA headquarters, 29 West 39th Street, New York, N. Y.

The national standardization work benefits American industry at large. All members of American industry are invited to participate in the active support and promotion of this work.

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